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(54) **IMPROVED ENERGY-SAVING AND EMISSION-REDUCING APPARATUS FOR DISTURBING AND BOOSTING MIXTURE GAS OF FUEL OIL ENGINE**

(57) The present invention discloses an improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines. A spring-type device (2) and a propeller-type device (3), both used for further enhancing the degree of mixed atomization of the mixed gas, are provided in a mixed gas

channel of an engine carburetor (2) and a choke (7). The spring-type device and propeller-type device are used for enhancing the degree of mixed atomization of the mixed gas, so that fuel is combusted more timely and sufficiently, thereby achieving the purposes of reinforcement, energy saving and emission reduction.

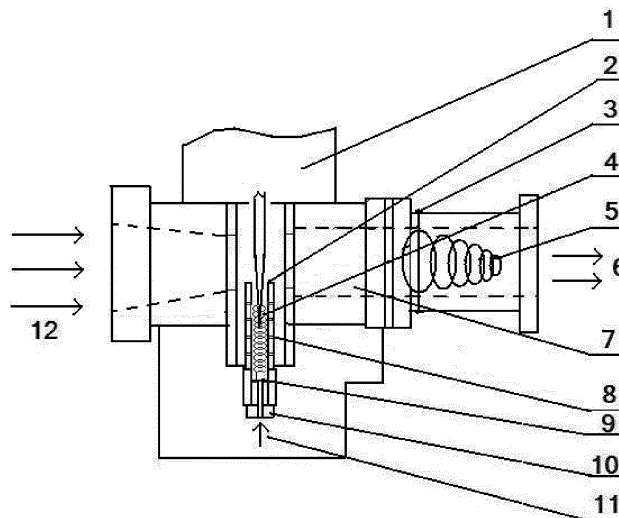


Fig. 1

Description**TECHNICAL FIELD**

[0001] The present invention relates to fuel engines, in particular to a mixed gas channel of a carburetor and choke of an engine

BACKGROUND OF THE PRESENT INVENTION

[0002] For an existing fuel engine, the mixed fuel-air atomization is accomplished mainly in the foam tube of the carburetor, the engine choke and the whole mixed gas channel.

[0003] Fuel first enters, under the negative pressure suction of the suction air when a piston inside an engine cylinder configuring the carburetor operates, the foam tube from the main metering jet of the carburetor, is initially mixed with air entering the foam tube from a miniature vent under the negative pressure suction of the flowing fuel, and then secondarily mixed with air entering the choke for atomization. Finally, the mixed gas enters a combustion chamber of the engine cylinder to be ignited by a spark plug to result in high-temperature, high-pressure and instantaneously-exploded gas, which drives the piston and thus other mechanical components to work.

[0004] For an electric fuel injection engine, the mixed fuel-air atomization is accomplished mainly in the engine choke and the whole mixed gas channel.

[0005] With the existing carburetor foam tubes and chokes, there is a disadvantage of insufficient and non-uniform mixing of fuel and air. Consequently, the fuel particles cannot be atomized completely, thereby resulting in incomplete and untimely combustion, insufficient release of energy, waste of fuel and high emission.

SUMMARY OF THE PRESENT INVENTION

[0006] In view of the problem of insufficient and non-uniform mixed atomization of fuel and air, a technical problem to be solved in the present invention is to provide a spring-type or propeller-type device for performing turbulence to a mixed gas.

[0007] To solve the technical problem mentioned above, in the present invention, a spring-type turbulence device is additionally mounted in a foam tube of a carburetor, so that air entering the foam tube from a miniature vent is mixed with fuel more fully, and the degree of mixed atomization is then further enhanced in a choke channel by the turbulence of the spring-type device or the turbulence of an inactive-power propeller device.

[0008] For the inactive-power propeller device mounted inside the choke channel of the engine, the propeller is rotated under the drive of high-speed airflow caused when the engine works, so that the fuel particles are mixed with air more fully and uniformly for atomization.

[0009] The present invention has the following beneficial effects: fuel is mixed with air more fully and uniformly

under the turbulence of the spring-type device inside the foam tube of the carburetor and of the spring-type device or inactive-power propeller-type device inside the choke channel; and the mixed gas is then fed into a cylinder to be ignited to work. As a result, more complete and in-time combustion, large power output, reduced fuel consumption and reduced emission and low cost investment are realized.

BRIEF DESCRIPTION OF THE DRAWINGS**[0010]**

Fig. 1 is a structure diagram of a spring-type turbulence device according to the present invention, in which:

1: Carburetor; 2: Foam tube; 3: Fixed base of a spring-type turbolator for a choke channel; 4: Spring-type turbolator for the foam tube; 5: Spring-type turbolator in a choke channel; 6: Mixed gas; 7: Choke and channel; 8: Miniature vent; 9: Fixed base of the spring-type turbolator for the foam tube; 10: Main metering jet; 11: Fuel; and 12: Air; and

Fig. 2 is a structure diagram of a propeller-type turbulence device according to the present invention, in which:

1: Front face of the propeller-type turbolator; 2: Side face of the propeller-type turbolator; 3: Choke channel; 4: Fixed base of the propeller-type turbolator; 5: Connecting ring; and 6: Cylinder.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0011] A spring-type turbulence device for a foam tube, as shown in Fig. 1, may be provided with an annular base and tightened by a main metering jet after mounted into the foam tube. The device is convenient for disassembly, cleaning and replacement.

[0012] A spring-type turbulence device for a choke channel, as shown in Fig. 1, may be provided with a criss-cross fixed base and mounted in a connecting tube where the choke and a cylinder are connected to each other.

[0013] The fixed base of the propeller-type turbolator, as shown, in Fig. 2, may refer to the crisscross fixed base of the spring-type turbolator for the choke channel as shown in Fig. 1.

[0014] It is to be noted that the present invention is applicable to all fuel engines.

[0015] The foregoing embodiments of the present invention are merely examples of the present invention and not intended to limit the implementations of the present invention. Variations and alterations of other different

forms may be made by those skilled in the art on the basis of the above description. It is not intended to exhaustively list all implementations herein. Any technical solutions of additionally providing a fuel-air mixing device in the foam tube of the carburetor or in the choke channel and derivatives thereof shall fall into the protection scope of the present invention. 5

Claims 10

1. An improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines, **characterized in that** devices, used for further enhancing the degree of mixed atomization of a mixed gas, are provided in a foam tube of an engine carburetor, a choke and a whole mixed gas channel. 15

2. The improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines according to claim 1, **characterized in that** the improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines is a spring-type device mounted in the foam tube of the carburetor or a device of any other shapes derived therefrom. 20 25

3. The improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines according to claim 1, **characterized in that** the improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines is a spring-type device mounted in the engine choke and in the whole mixed gas channel or a device of any other shapes derived therefrom. 30 35

4. The improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines according to claim 1, **characterized in that** the improved device for reinforcing mixed gas turbulent flow, saving energy and reducing emission of fuel oil engines is a propeller-type device mounted in the engine choke and in the whole mixed gas channel or a device of any other shapes derived therefrom. 40 45

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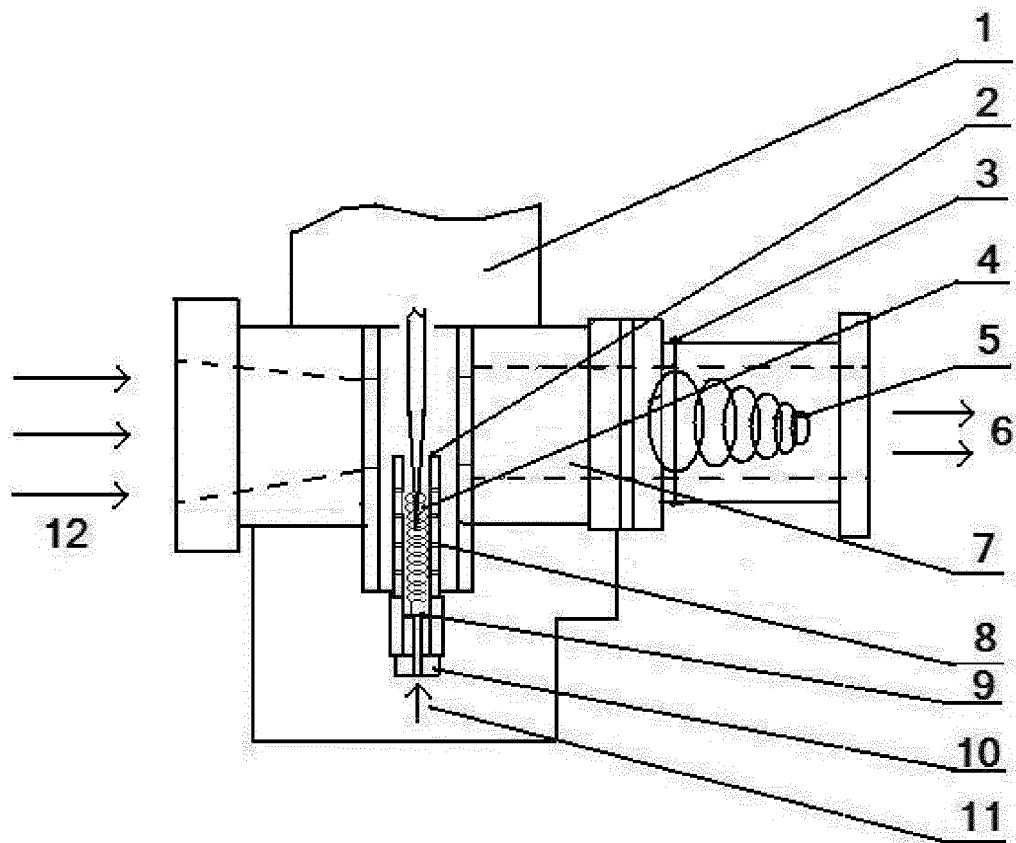


Fig. 1

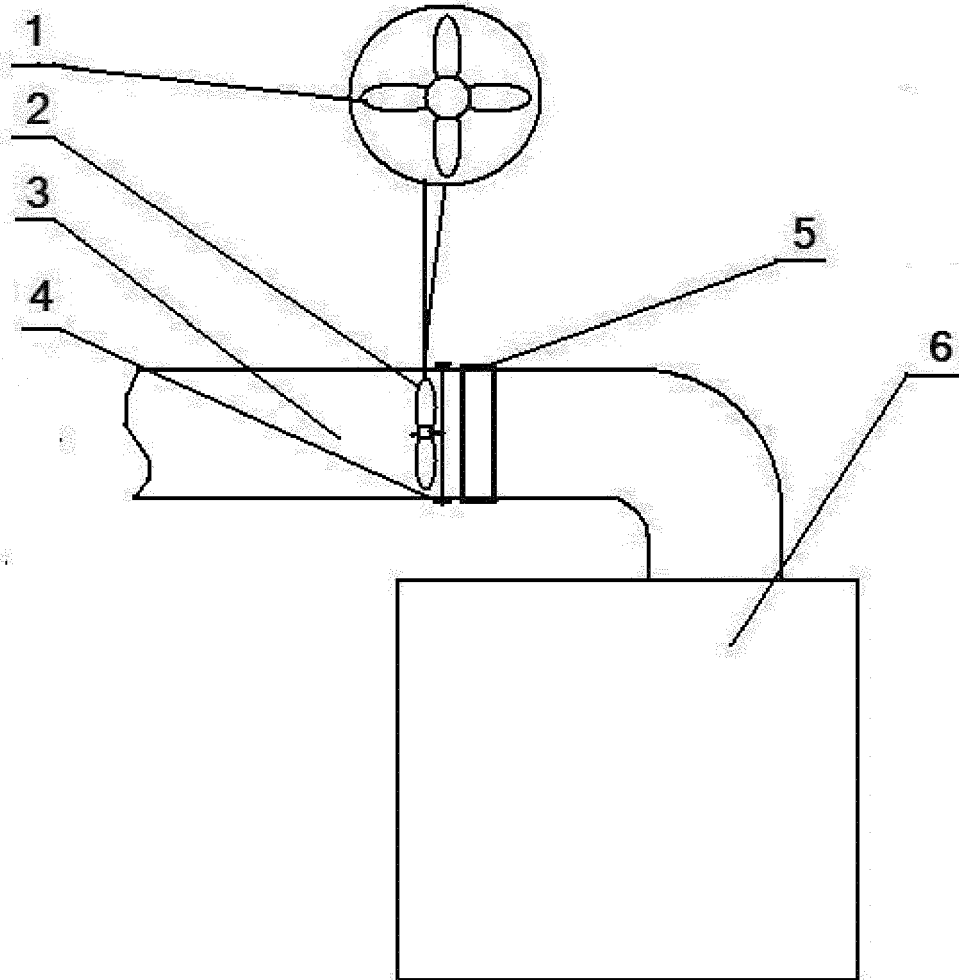


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2013/000951

5	A. CLASSIFICATION OF SUBJECT MATTER		
	See the extra sheet		
	According to International Patent Classification (IPC) or to both national classification and IPC		
10	B. FIELDS SEARCHED		
	Minimum documentation searched (classification system followed by classification symbols)		
	IPC: F02M		
15	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
20	CNPAT, CNKI, WPI, EPODOC: turbine, elasticity; spring, fan, spiral, helix, spoiler, disturbance, perturbation, uniformity, carburetor		
	C. DOCUMENTS CONSIDERED TO BE RELEVANT		
	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
25	P, X	CN 102828855 A (XU, Wenxin), 19 December 2012 (19.12.2012), the whole document	1-4
	P, X	CN 202900448 U (XU, Wenxin), 24 April 2013 (24.04.2013), the whole document	1-4
	X	CN 2575315 Y (YAN, Shouqiang), 24 September 2003 (24.09.2003), description, page 1, line 21 to page 2, line 15, and figures 1-2	1-3
30	X	CN 86203780 U (YANG, Hengshan), 16 September 1987 (16.09.1987), description, page 1, line 14 to page 3, line 5, and figures 1-2	1, 4
	X	US 5638797 A (HYUNDAI MOTOR CO., LTD.), 17 June 1997 (17.06.1997), description, column 2, line 20 to column 4, line 6, and figures 1-3	1, 4
	X	US 3847128 A (PALOTSEE, J.J.), 12 November 1974 (12.11.1974), description, column 2, line 19 to column 3, line 52, and figure 1	1, 4
35	<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
	* Special categories of cited documents:	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
40	“A” document defining the general state of the art which is not considered to be of particular relevance	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
	“E” earlier application or patent but published on or after the international filing date	“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
45	“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	“&” document member of the same patent family	
	“O” document referring to an oral disclosure, use, exhibition or other means		
	“P” document published prior to the international filing date but later than the priority date claimed		
50	Date of the actual completion of the international search	Date of mailing of the international search report	
	11 November 2013 (11.11.2013)	16 January 2014 (16.01.2014)	
	Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer LIU, Yang Telephone No.: (86-10) 62085280	
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INTERNATIONAL SEARCH REPORT

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6258144 B1 (HUANG, J.), 10 July 2001 (10.07.2001), description, column 2, line 54 to column 3, line 50, and figures 4-9	1, 4
X	CN 2898342 Y (YU, Wenkai), 09 May 2007 (09.05.2007), description, page 1, line 12 to page 3, line 11, and figures 1-2	1, 4
A	CN 2101769 U (YANG, Jiyong), 15 April 1992 (15.04.1992), the whole document	1-4

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2013/000951

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CN 2101769 U	15.04.1992	None	

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International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

F02M 29/08 (2006.01) i

F02M 29/06 (2006.01) i

F02M 29/02 (2006.01) i

F02M 7/12 (2006.01) i